DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-8 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rauschnabel et al (WO 99/63129), citations below from English language equivalent (US Patent No. 6,613,393), in view of Ichihara et al (US Patent No. 4,782,477) and Casey (US Patent No. 4,692,233).

With respect to claims 1, 3, 5, and 7, Rauschnabel et al discloses a sputtering method with a vacuum chamber (col. 5, lines 15-20), a cylindrical substrate holder (fig. 4, turntable [60]) (It is noted that an error in fig. 4 lists the turntable as part [50]. Col 7, line 16 states that the turntable should be part [60]) with the substrate mounted on the outer periphery of a thin cylindrical surface (fig. 4, [41], [50]; fig. 5, [41], [50]). The vacuum chamber is divided into four compartments, with two (fig. 4, [47], [48]; col. 7, lines 12-15) having gas supplied to them (i.e. sputter deposition compartments). Rauschnabel et al depicts fig. 5 as a section along line V-V through the apparatus according to fig. 4. Fig. 5 further illustrates two sets of cathodes and targets [52], [53] in separate compartments separated by a partition [54]. The partition can also be seen in fig. 5 separating the middle of the turntable [60]. Fig. 5 also shows two sets of gas inlets

[44], [51] that can be seen entering each of the separate compartments to generate separate plasmas (col. 7, lines 15-23). Furthermore, Rauschnabel et al discusses coating times can be further reduced by operating the two deposition processes (i.e. cathode) simultaneously (col. 1, lines 65-67), thus the plasma generators that sputter the coating materials also operate simultaneously. Furthermore Rauschnabel '393 discloses that greater separation between process gas atmospheres by pumping down the chamber between processes (col. 5, lines 9-14). In addition, Rauschnabel '393 also states that the vacuum chamber is compartmentalized to manage fresh gas and exhaust gas flows leading to a superior separation of the processes by controlled adaptation to the desired stoichiometry (col. 5, lines 15-22). However Rauschnabel et al is limited in that while a cathode shutter is used (col. 5, lines 1-6), it is not suggested to have two that operate simultaneously. Rauschnabel et al is further limited in that while exhaust systems are discussed, it is not suggested as to the placement of said exhaust systems.

Ichihara et al teaches a sputtering apparatus for an optical (i.e. recording) layer comprising a substrate support [50] capable of rotation [52] with a sputtering supply gas [42], a sidewall exhaust system [44], targets [32L], [32R], and shutters [36L], [36R] (abstract; fig. 2). In addition, Ichihara et al teaches rotating the holder [50] with shutters [36] corresponding to a Tb-target and Co-target sputter sources [32] and simultaneously opening said shutters to form a Tb-Co film on each substrate (col. 6, lines 14-20). Ichihara et al also discusses that this process can be used with a sputtering apparatus as depicted or by a plasma polymerization apparatus (col. 10, lines 51-66).

It would have been obvious to one of ordinary skill in the art to use two shutters for the two cathode target for use in a sputtering apparatus or plasma polymerization apparatus as taught in Ichihara et al (col. 10, lines 62-66) to improve the sputter apparatus or plasma polymerization apparatus having single shutter cathode target in a Rauschnabel et al (col. 4, lines 66-67; col. 5, lines 1-8) for the predictable result of improving deposition control of the two cathode targets.

Furthermore it would have been obvious to one of ordinary skill in the art to use the location of the vacuum pump system of Ichihara et al for the disclosed vacuum port of Rauschnabel et al since Rauschnabel et al fails to specify a location. Because both references teach exhaust (i.e. vacuum) systems in similar devices, it would be obvious to substitute the particulars of one into the other to achieve the predictable result of evacuating the chamber. *KSR International Co v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d 1385 (2007).

However Rauschnabel et al is further limited in that it is not specifically suggested to have a separate exhaust port for each partitioned chamber.

Casey teaches a vacuum metallizer comprising a vacuum chamber [1] split into three sub-chambers via partitions [5]-[8], where each sub-chamber are individually pumped via vacuum pumps [30]-[32] (abstract; fig. 2). Casey cites the advantage of using individual vacuum pumps as restricting gas leakage between adjacent sub-chambers (abstract), thus leading to increased purity and control of deposition material for each sub-chamber.

It would have been obvious to one of ordinary skill in the art to use individual vacuum pumps per sub-chamber taught in Casey for the apparatus of Rauschnabel et al to gain the advantage of superior purity and control of deposition material.

With respect to claims 2 and 6, modified Rauschnabel et al further discloses that DC magnetron sputtering, pulsed magnetron sputtering, or double-cathode sputtering can be used (col. 3, lines 33-41).

With respect to claims 4 and 8, modified Rauschnabel et al further discloses a plasma generator using microwave discharge (col. 2, lines 43-48). Modified Rauschnabel et al also discloses that in addition to microwave plasma, bias voltages can also either be used in conjunction with the microwave plasma or solely by itself (col. 3, lines 11-16). Modified Rauschnabel et al further states that "high frequency bias voltages have proven particularly effective in this context (col. 3, lines 16-18).

With respect to claims 13 and 14, modified Rauschnabel et al further depicts in fig. 5 two distinct targets [53] with each target having reactive gas [51] and sputter gas [44] in proximity. In addition, modified Rauschnabel et al discusses using various metals and their oxides deposited via sputtering (col. 3, lines 60-67; col. 4, lines 1-8).

With respect to claims 15-16, Casey teaches using multiple vacuum pumps by placing a vacuum pump [30]-[32] per sub-chamber (abstract; fig. 2). However Casey is limited in that it is not suggested to incorporate multiple vacuum pumps per sub-chamber. It has been held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). Therefore it would have been obvious to one of ordinary skill in the

art to place multiple vacuum pumps per sub-chamber for the predictable result of maintaining a vacuum, purity, and control of deposited material.

Response to Arguments

3. Applicant's arguments with respect to claims 1-8 and 13-16 have been considered but are moot in view of the new ground(s) of rejection due to newly added limitations of multiple vacuum pumps per chamber.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent No. 5,382,126.

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 8am-4pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

7. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795